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Quantifying Peatland Carbon Accumulation in North America Using a Process-Based Biogeochemistry Model

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We parameterized and tested an extant peatland biogeochemistry model TEM using observed data of plant productivity, carbon fluxes, and peat carbon accumulation rates as well as other physical variables in various peatlands in North America. To quantify regional peatland carbon accumulation since peatland initiation in this region, we have organized many layers of data to drive our model, including paleo-climate from Trace-21000 Transient model simulations and future climate data from IPCC ensemble climate model simulations, the basal age data based on site-level observations, and peatland distribution as well as inundation area in recent years from satellite observations. In this presentation, we will show the comparison between model simulation and field measurements at multiple peatland sites with regard to their long-term peat carbon accumulation rates, and the comparisons between observed and modeled soil moisture, water-table depth, methane emissions, and soil temperature profile. We will also present our preliminary findings on regional peatland carbon accumulation in the past and project the fate of the regional peatland carbon during the 21st century.